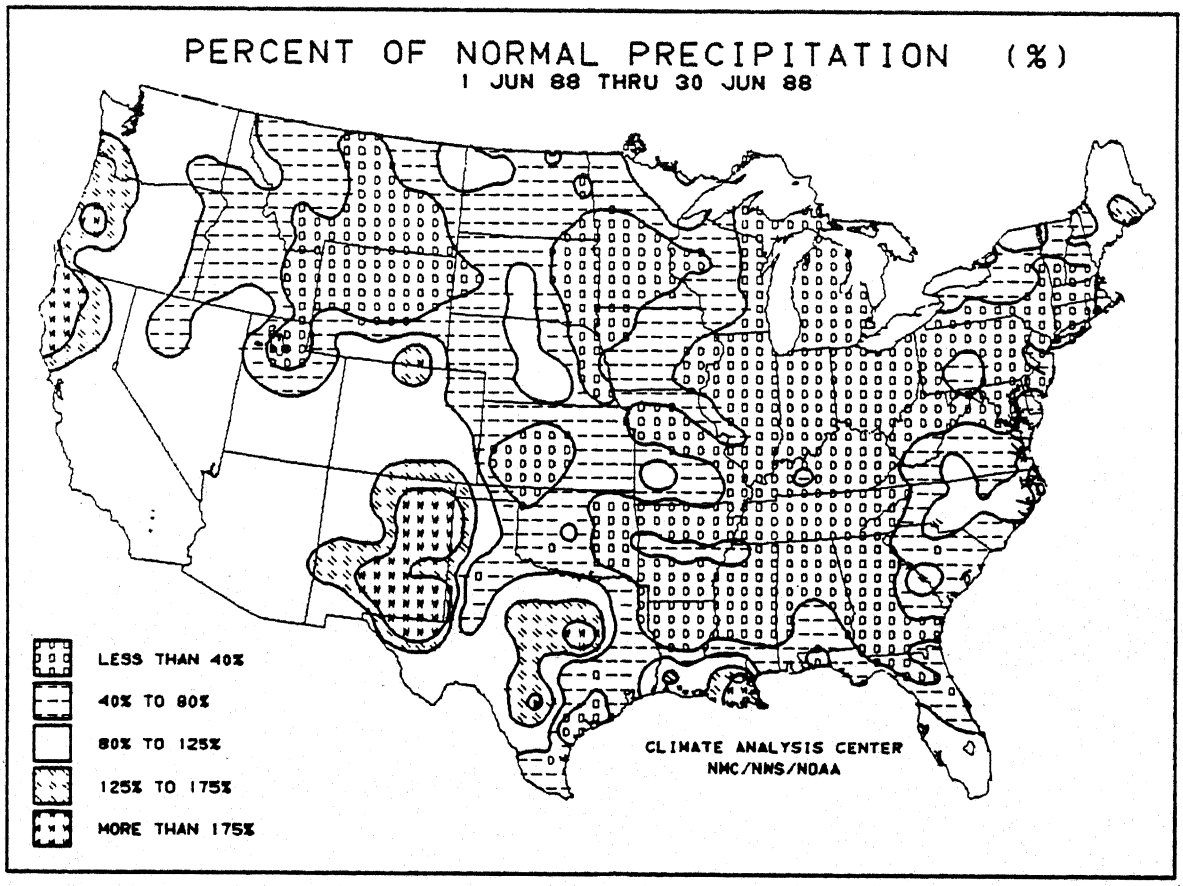
CLIMATE ANALYSIS CENTER

WEEKLY CLIMATE BULLETIN

No. 88/28 Washington, DC July 9, 1988



JUNE 1988 WAS NO EXCEPTION AS EXTREMELY DRY WEATHER CONTINUED TO AFFLICT MUCH OF THE EASTERN HALF OF THE NATION SINCE THE START OF SPRING. FOR FURTHER DETAILS ON THIS AND RECORD WARM TEMPERATURES, REFER TO THE U.S. MONTHLY CLIMATE SUMMARY.

NOAA - NATIONAL WEATHER SERVICE - NATIONAL METEOROLOGICAL CENTER

WEEKLY CLIMATE BULLETIN

Editor:	David Miskus
Associate Editor:	Paul Sabol
Contributors:	Keith W. Johnson
	Vernon L. Patterson
Graphics:	Robert H. Churchill
	Robert P. Nester

This Bulletin is issued weekly by the Climate Analysis Center and is designed to indicate, in a brief, concise format, current surface climatic conditions in the United States and around the world. The Bulletin contains:

Highlights of major global climatic events and anomalies.
U.S. climatic conditions for the previous week.
U.S. apparent temperatures (summer) or wind chill (winter).
Global two-week temperature anomalies.
Global four-week precipitation anomalies.
Global monthly temperature and precipitation anomalies.
Global three-month precipitation anomalies (once a month).
Global twelve-month precipitation anomalies (every 3 months).
Global temperature anomalies for winter and summer seasons.
Special climate summaries, explanations, etc. (as appropriate).

Most analyses contained in this Bulletin are based on preliminary, unchecked data received at the Center via the Global Telecommunication System. Similar analyses based on final, checked data are likely to differ to some extent from those presented here.

To receive copies of the Bulletin or change mailing address, write to:

Climate Analysis Center, W/NMC53
Attention: Weekly Climate Bulletin
NOAA, National Weather Service
Washington, DC 20233
Phone: (301)-763-8071

GLOBAL HIGHLIGHTS

MAJOR CLIMATIC EVENTS AND ANOMALIES AS OF JULY 9, 1988
(Approximate duration of anomalies is in brackets.)

1. United States and South Central Canada:
WARM, DRY CONDITIONS PERSIST.
Most stations reported less than 12.7 mm (0.50 inch). Unusually warm conditions persisted in the north central states with temperatures as much as 8.2°C (14.8°F) above normal. See U.S. Weekly Weather Highlights and Special Climate Summary for additional details [17 weeks dry - 10 weeks warm].

2. Kazakh S.S.R.:
VERY WARM CONDITIONS PREVAIL.
Unusually high temperatures occurred across much of the Kazakh S.S.R. and adjacent Soviet Socialist Republics and were as much as 4.3°C (7.7°F) above normal [8 weeks].

3. Europe and North Africa:
EXTENSIVE AREA IS UNUSUALLY WARM.
Temperatures averaged up to 9.5°C (17.1°F) above normal as unusually warm weather spread across most of Europe and northern Africa [2 weeks].

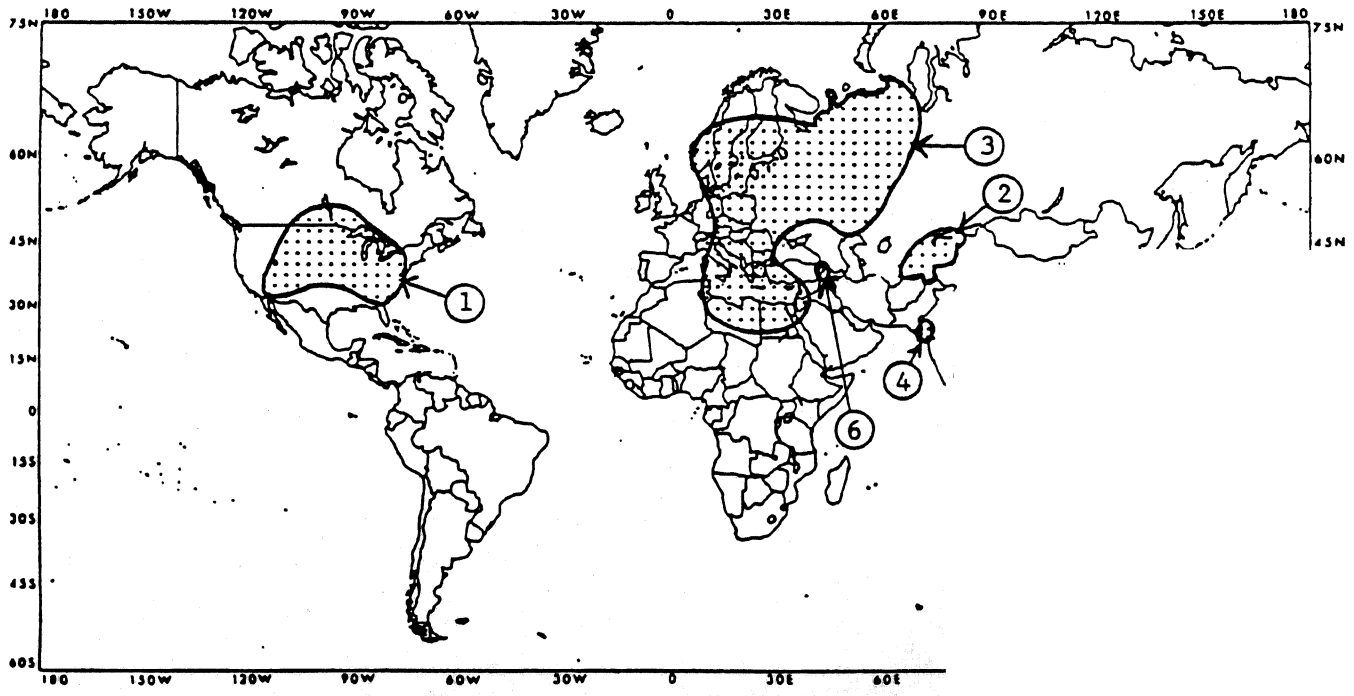
4. Western India:
RAINS BRING MORE RELIEF.
As much as 67.2 mm (2.65 inches) of rain fell at stations in western India and brought more relief; however, rainfall amounts remained well below normal in extreme western India [8 weeks].

5. East Central China:
DRYNESS CONTINUES.
Light precipitation, generally less than 16.4 mm (0.65 inch), was reported at stations in east central China [6 weeks].

6. Turkey:
TEMPERATURES RETURN TO NORMAL.
Unusually cool conditions in Turkey ended as temperatures rose to near normal or above normal levels. Precipitation totals also returned to near normal amounts. [Ended at 3 weeks].

7. Bangladesh and Northeastern India:
MONSOON RAINS BRING FLOODS.
Heavy monsoon rains, up to 272.0 mm (10.70 inches), brought extensive flooding to parts of eastern Bangladesh and Assam Province in northeastern India [5 weeks].

8. South Korea:
HEAVY RAINS IN NORTH; DRY IN SOUTH.
Very heavy rains, as much as 267.2 mm (10.51 inches), fell across extreme northern South Korea. In contrast, in the southern part of the country the rainfall totals were generally less than 13.5 mm (0.53 inch) [Episodal Event].



Approximate locations of the major anomalies and events descr this map. See the other world maps in this Bulletin for curr anomalies, four-week precipitation anomalies, and (occasionall

U.S. WEEKLY WEATHER HIGHLIGHTS

FOR THE WEEK OF JULY 3 THROUGH JULY 9, 1988

Portions of the Gulf Coast, central and southern Great Plains, and upper Midwest received heavy rainfall from scattered showers and thunderstorms last week (see Table 1). Tropical Gulf moisture deluged stations in southeastern Texas, Louisiana, southern Arkansas, southern Mississippi, and southern Alabama where maximum amounts totaled 6.3, 6.1, 4.0, 5.2, and 7.7 inches, respectively, according to the River Forecast Center data (see Figure 1). Extreme southeastern Florida measured up to 4.9 inches of precipitation as wet conditions have persisted for eight consecutive weeks. In the Great Plains, torrential thunderstorms soaked northwestern Texas, eastern New Mexico, the Oklahoma panhandle, and various locations in eastern Colorado, western Kansas, and southern Nebraska (see Figure 2), but failed to reach much of the drought-stricken regions of the Midwest and Southeast. Farther north, however, a band of thunderstorms preceding a cold front brought some relief (between 1-3 inches) to sections of eastern North Dakota, southern Minnesota, northern Iowa, and central Wisconsin. Light to moderate amounts were recorded along the Pacific Northwest Coast, in the northern and southern Rockies, throughout most of the Great Plains, in the upper Midwest, along the Gulf Coast and northward into parts of the southern Appalachians, and at a few stations in the mid-Atlantic and New England regions. Little or no precipitation occurred along the southern half of the Pacific Coast, throughout the Intermountain region, in portions of the northern and central Rockies and upper Missouri Valley, the eastern Great Lakes, the middle Mississippi Valley and Ohio Valley, and various locations along the Atlantic Coast as abnormally dry conditions continued in the latter five areas.

The hot weather shifted eastward, centering itself over the upper Midwest, Great Lakes, and Ohio Valley (see Table 2), while the northern Rockies and northern Great Plains "cooled off" to more seasonable temperatures after observing record warmth during the past 10-13 weeks. Several cities in the central and eastern U.S. broke daily record maximum temperatures as highs in the upper nineties and lower one hundreds were common throughout the week (see Figure 3), especially in the Ohio and Tennessee Valleys. Temperature departures of 9-15^{o}F above normal prevailed from the Dakotas eastward to Lake Erie. Elsewhere, slightly above normal temperatures were observed in the Southwest and central Rockies, the southern thirds of Texas and Florida, in Hawaii and the western two-thirds of Alaska, and the northern half of Eastern Seaboard. Cooler conditions existed in the Pacific Northwest and California, the southern Great Plains and the Southeast, and southeastern Alaska. Greatest departures below normal (between -4 to -7^{o}F) were located in eastern Washington, eastern Oregon, and northern Idaho (see Table 3).

TABLE 1. Selected stations with two or more inches of precipitation for the week.

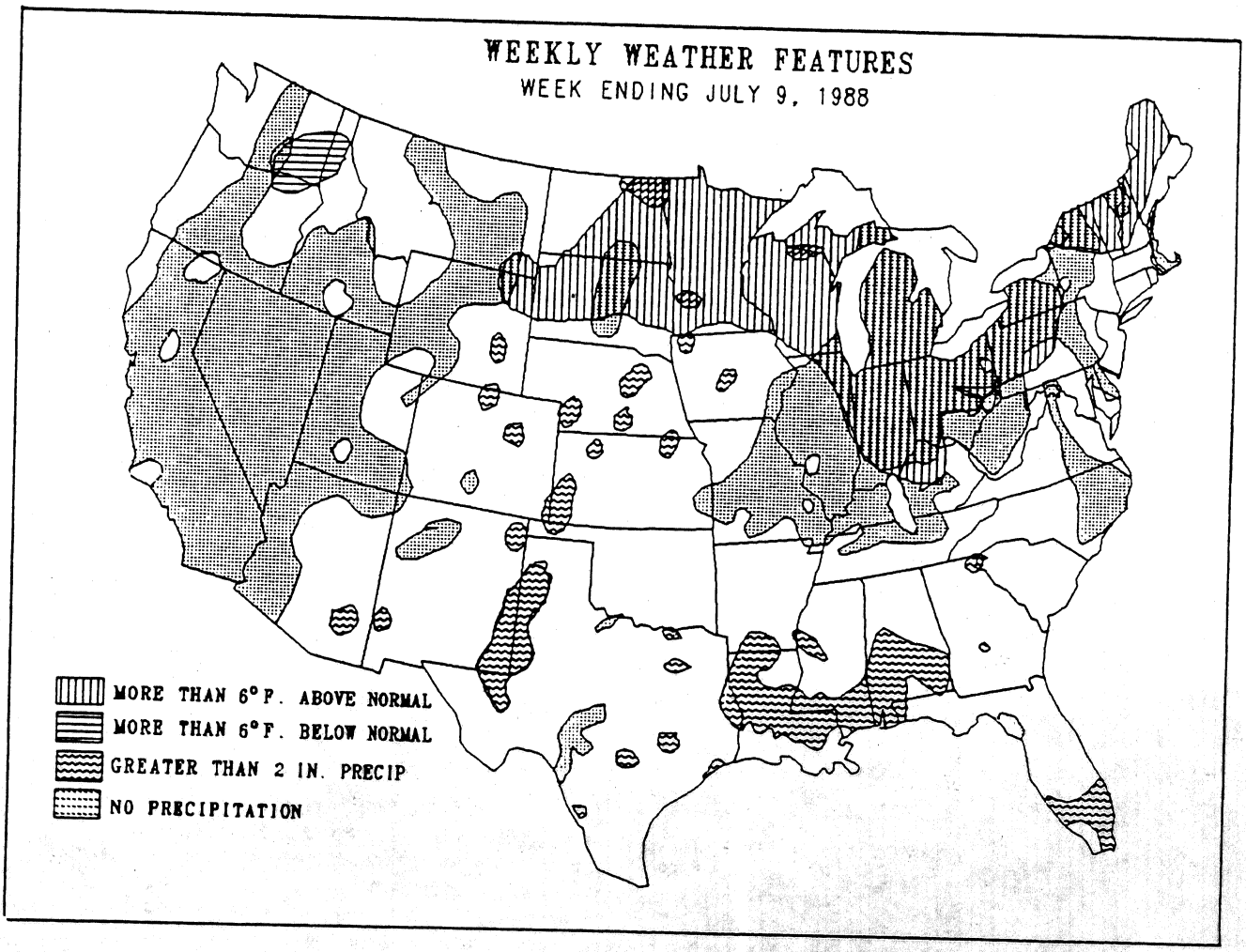
Midland, TX	5.24	Garden City, KS	2.33
West Palm Beach, FL	4.88	Grand Island, NE	2.33
Ozark/Cairns AFB, AL	4.70	Baton Rouge, LA	2.33
Lubbock/Reese AFB, TX	4.15	Grand Forks, ND	2.31
Charlotte, NC	4.00	Des Moines, IA	2.31
Vero Beach, FL	3.99	Port Arthur, TX	2.23
Lufkin, TX	3.75	Kokee, Kauai, HI	2.21
Mobile, AL	3.73	McComb, MS	2.19
Alexandria/England AFB, LA	3.48	Montgomery, AL	2.10
Homestead AFB, FL	3.43	Milton/Whiting NAS, FL	2.10
Galveston, TX	3.15	Deming, NM	2.09
Panama City, FL	3.05	Columbus, GA	2.09
Monroe, LA	2.86	Hilo, Hawaii, HI	2.08
Tuscaloosa, AL	2.75	New Orleans/Moisant, LA (MSY)	2.03
El Dorado, AR	2.49	New Orleans/Lk Front, LA (NEW)	2.00
Miami, FL	2.38		

TABLE 2. Selected stations with temperatures averaging greater than 8°F ABOVE normal for the week.

Station	TDepNml	AvgT(°F)	Station	TDepNml	AvgT(°F)
Hancock/Houghton Co., MI	+15	79	Sault Ste. Marie, MI	+10	73
Marquette, MI	+12	76	Minneapolis, MN	+ 9	82
Aberdeen, SD	+11	82	Findlay, OH	+ 9	82
Fargo, ND	+11	81	Detroit, MI	+ 9	81
Eau Claire, WI	+11	81	Saginaw, MI	+ 9	80
Jamestown, ND	+11	80	Selfridge AFB, MI	+ 9	80
Duluth, MN	+11	75	Flint, MI	+ 9	79
Akron, OH	+10	81	St. Cloud, MN	+ 9	79
Milwaukee, WI	+10	80	Green Bay, WI	+ 9	78
Alexandria, MN	+10	80	Wausau, WI	+ 9	78
Alpena, MI	+10	76	Park Falls, WI	+ 9	76
Pellston, MI	+10	75	International Falls, MN	+ 9	75

TABLE 3. Selected stations with temperatures averaging greater than 4°F BELOW normal for the week.

Station	TDepNml	AvgT(°F)	Station	TDepNml	AvgT(°F)
Spokane, WA	-7	62	Walla Walla, WA	-5	69
Yakima, WA	-7	63	Cape Hatteras, NC	-5	73
Pendleton, OR	-7	66	Amarillo, TX	-5	74
Burns, OR	-5	63	Sumter/Shaw AFB, SC	-5	75
Lewiston, ID	-5	68	Wilmington, NC	-5	75
Wenatchee, WA	-5	68	Jacksonville, FL	-5	77



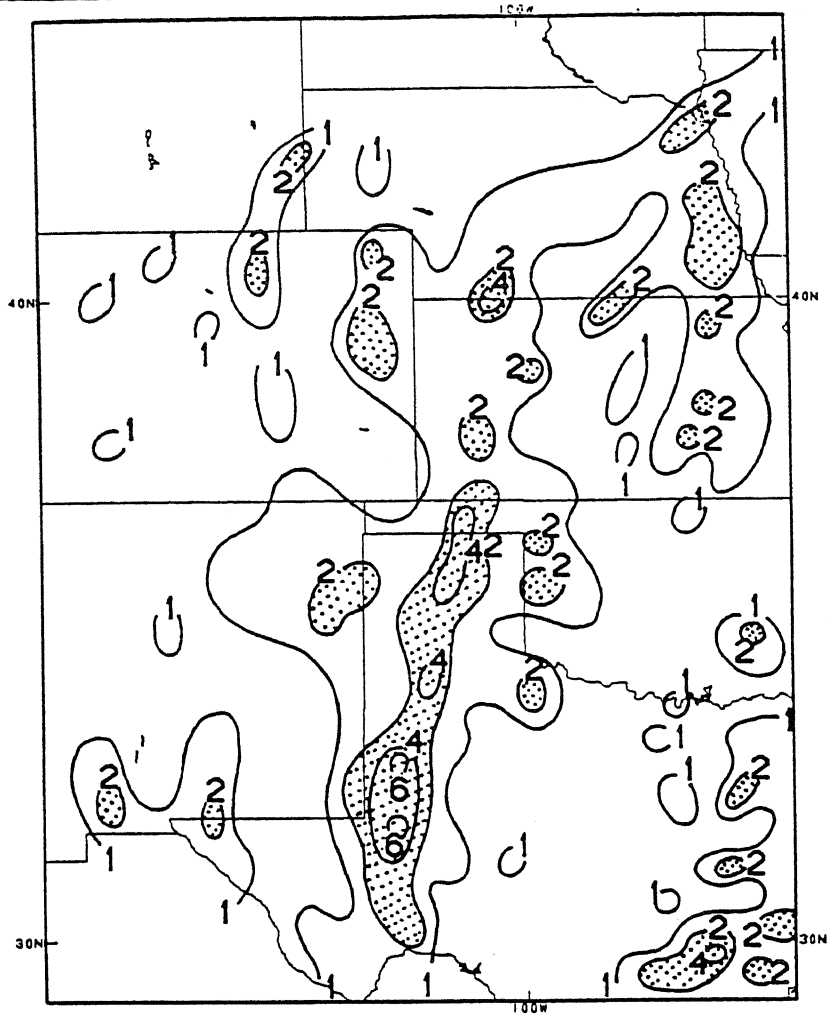


Figure 1. Total precipitation (inches) from July 3-9, 1988 (the zero isopleth was not analyzed). Heavy rains soaked the central and southern Great Plains, but missed much of the unseasonably dry areas to the east and northeast.

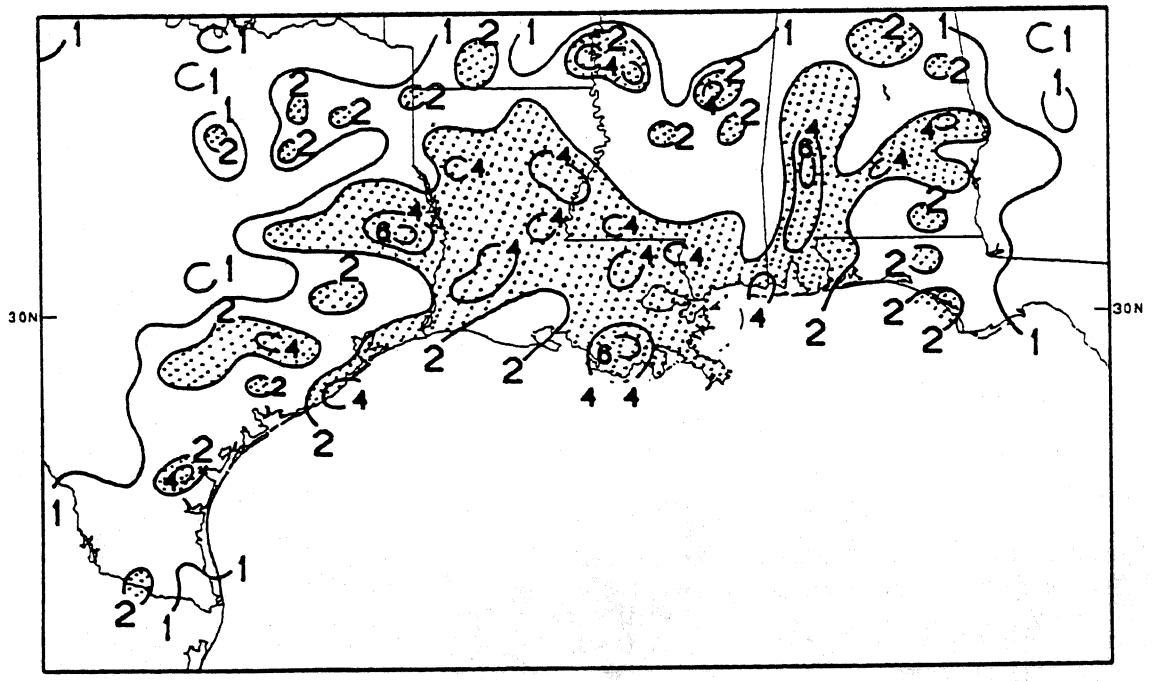


Figure 2. Total precipitation (inches) from 7/3-7/9/88 (the zero isopleth was not analyzed). Gulf moisture provided welcome rains to the unusually dry regions of eastern Texas, northern Louisiana, southern Arkansas, and sections of Mississippi and Alabama, however, drought-stricken areas to the north received little or no precipitation.

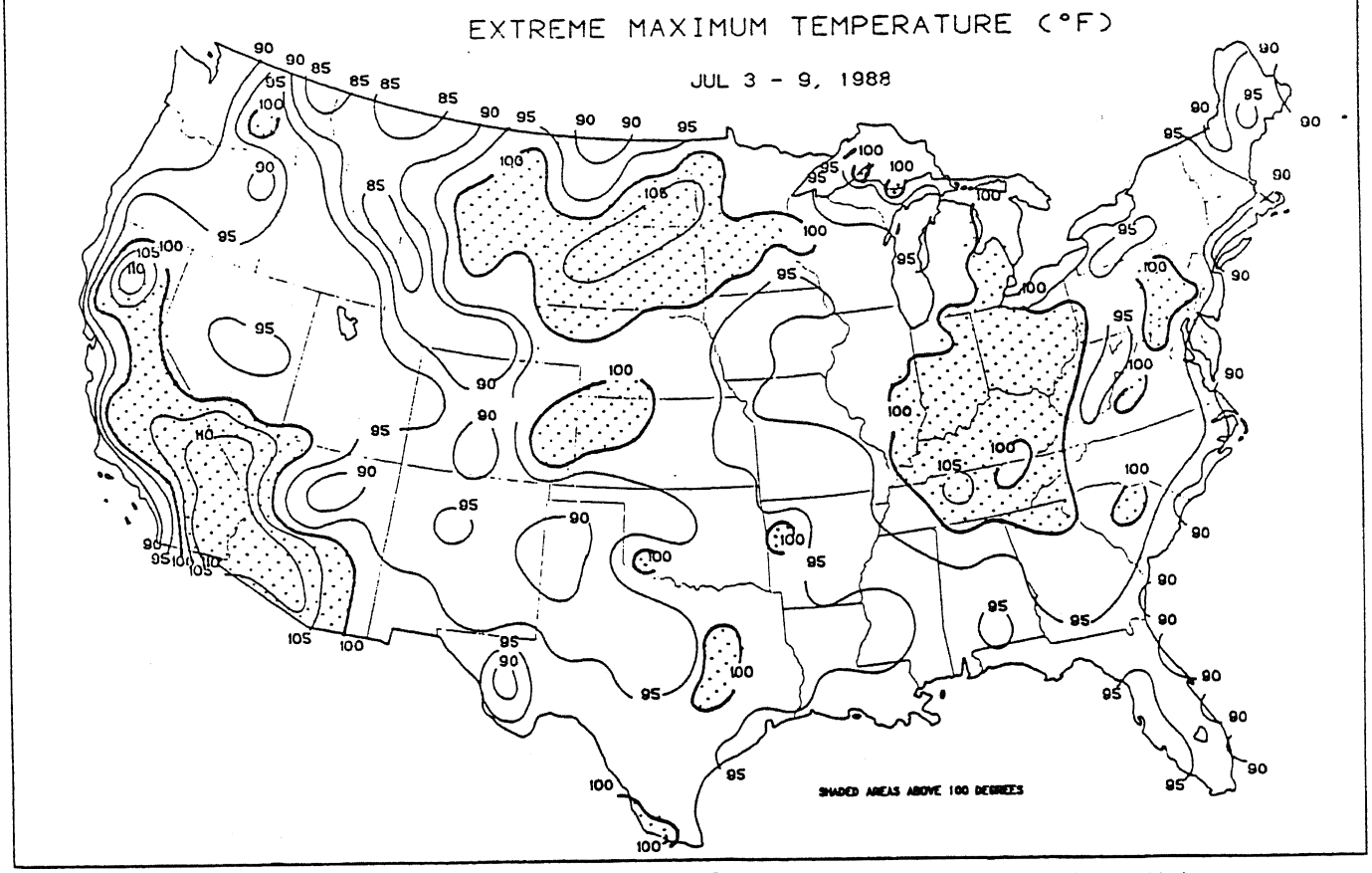
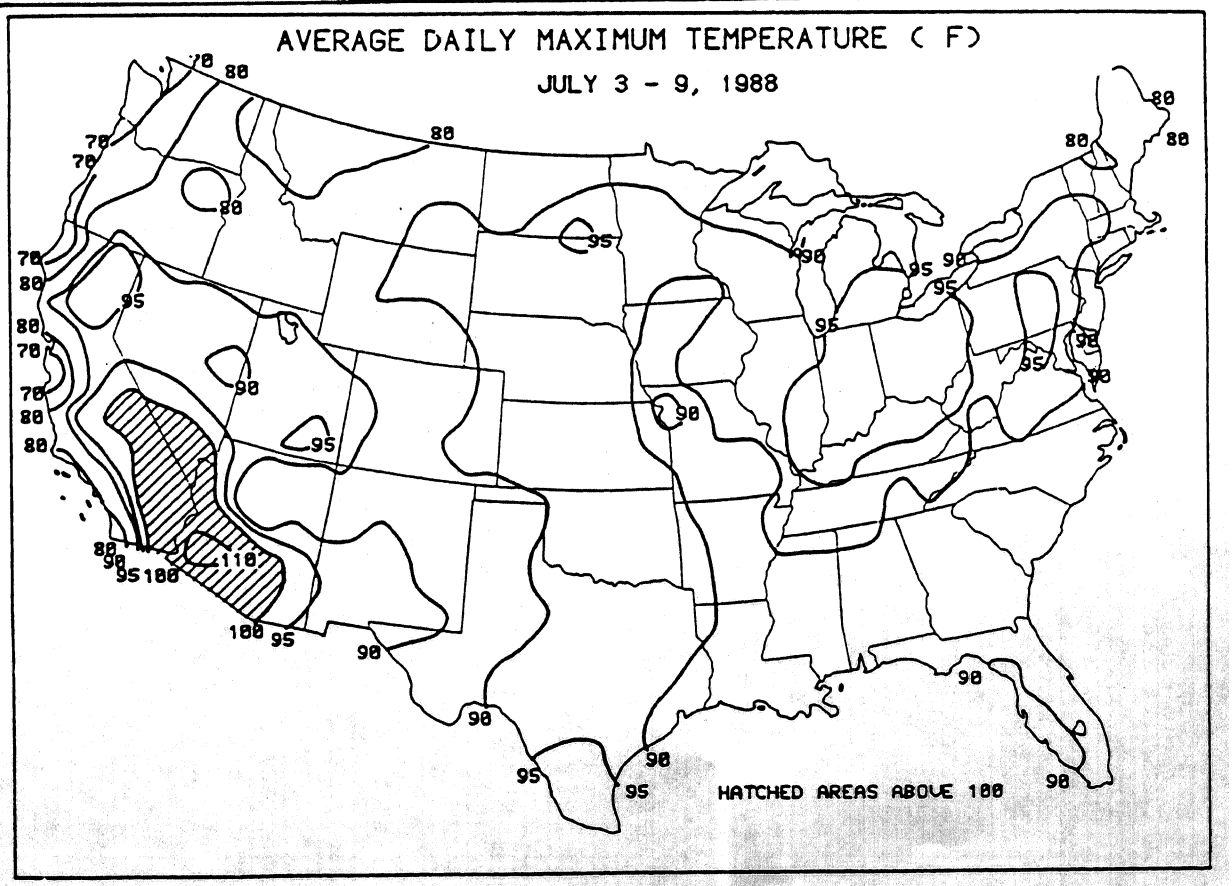
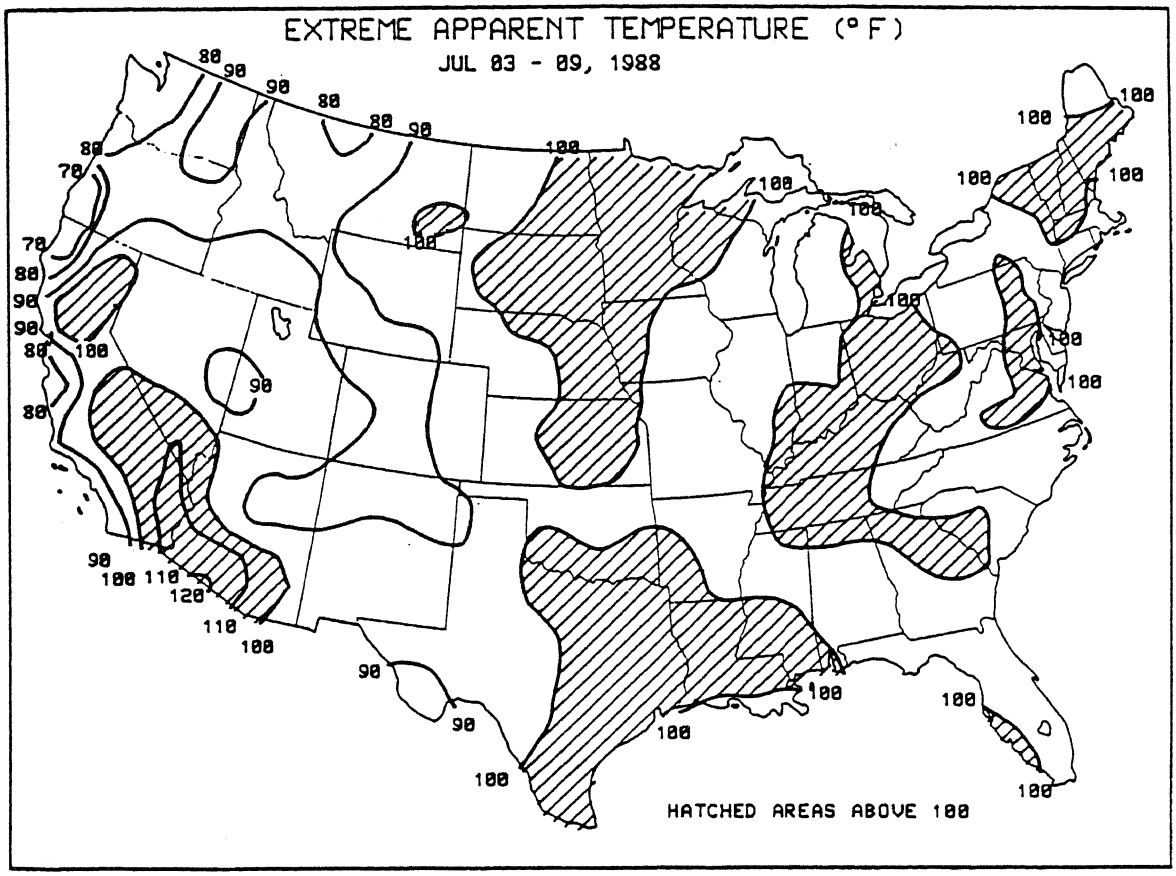
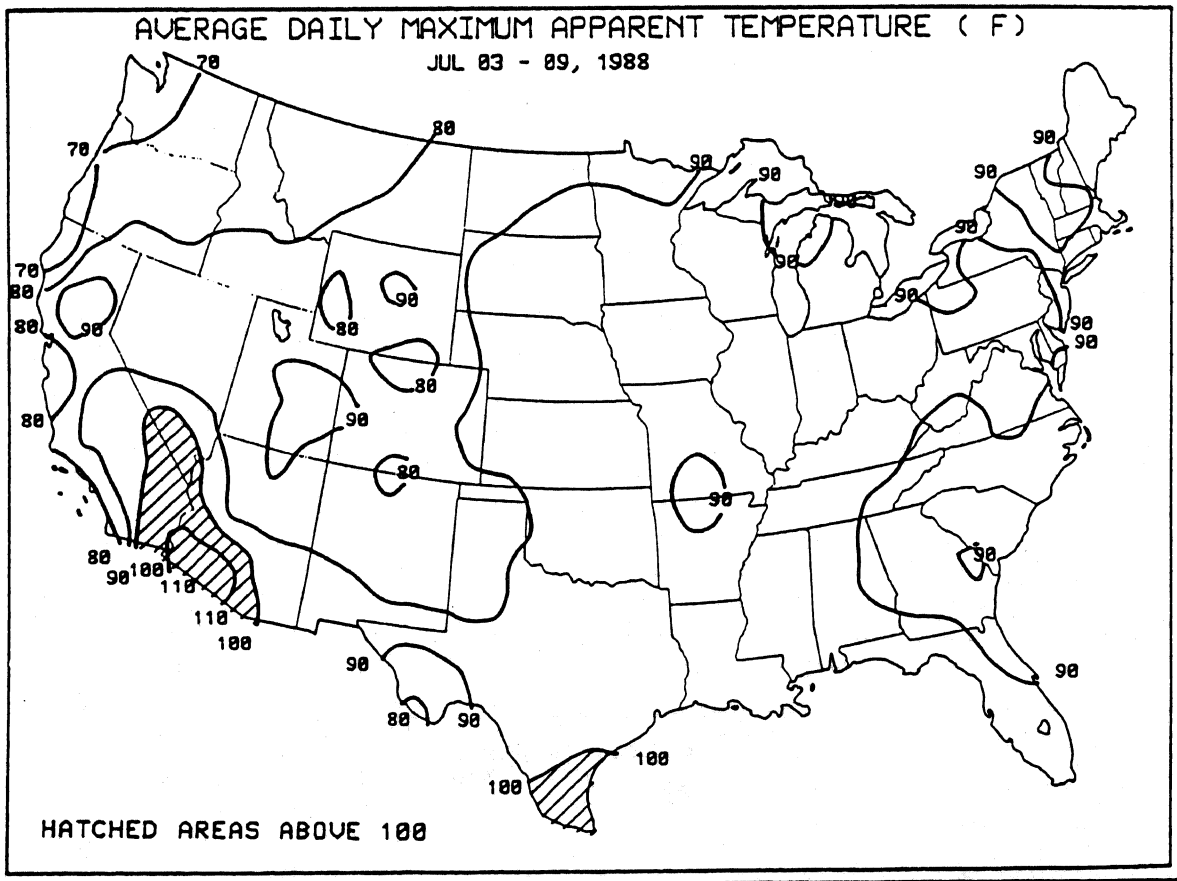


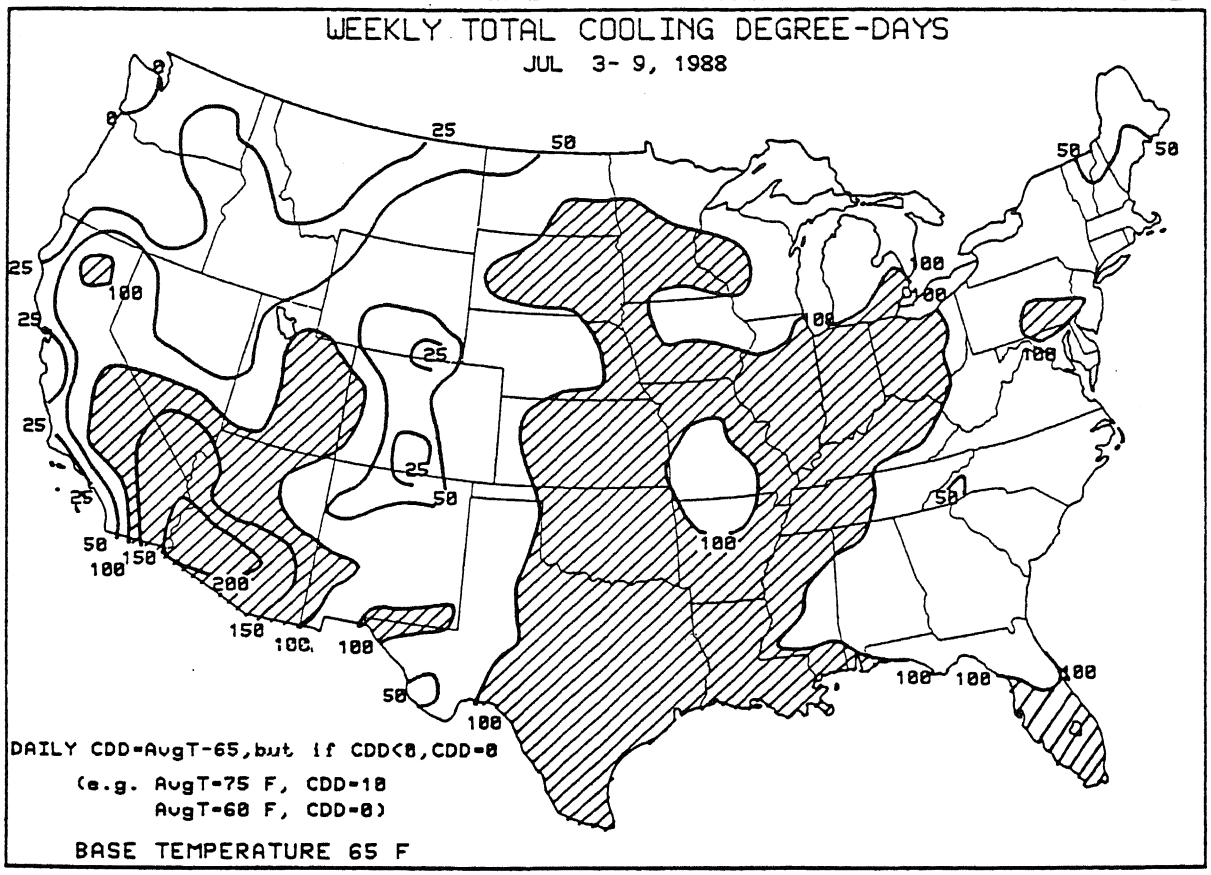
Figure 3. Extreme maximum temperatures (^{o}F) last week (7/3-7/9/88). Highs exceeded one hundred at least once in the northern Great Plains, but cooler air provided some relief later in the week. In the Ohio and Tennessee Valleys and Great Lakes region, however, temperatures remained well above normal the entire week, further aggravating the areas dry conditions.



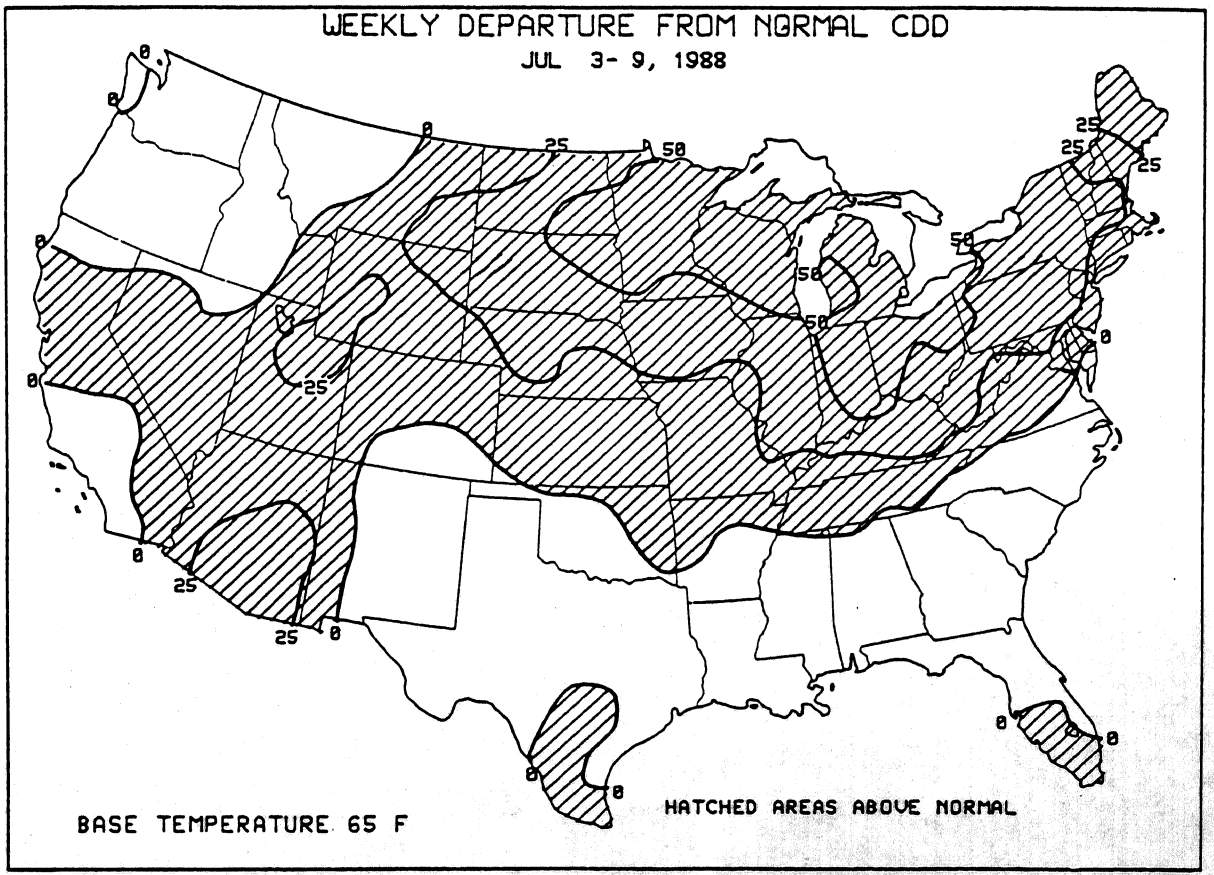


Hot weather and high humidity combined to produce dangerous (>=105°F) extreme apparent temperatures across parts of the South, Great Plains, Midwest, and East Coast regions (above). Throughout the week, uncomfortable apparent temperatures (over 95°F) prevailed in the desert Southwest, southern Texas, the Midwest, and in the mid-Atlantic (below).

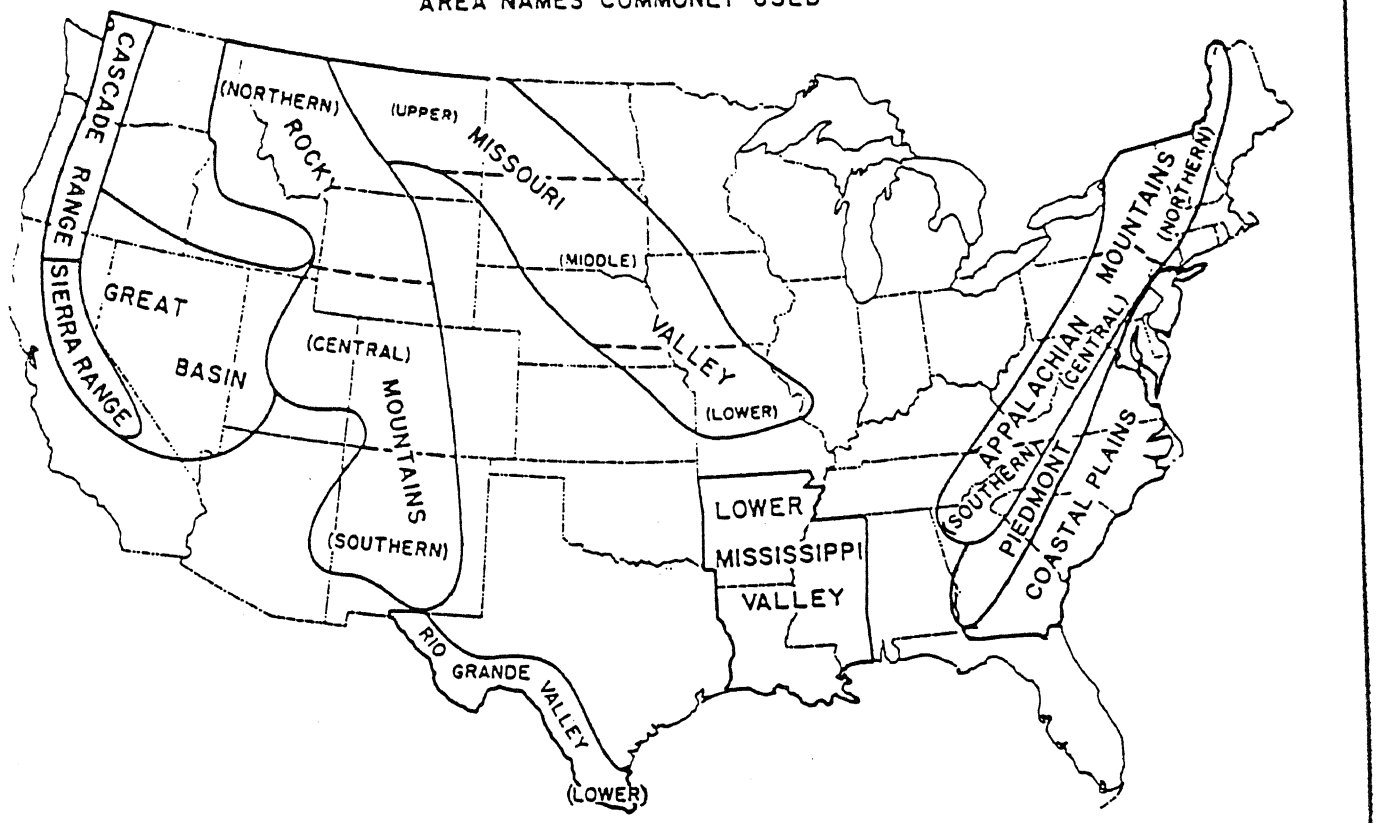




An above normal demand for air conditioning (cooling degree days) was prevalent in the Southwest, central Rockies, northern Great Plains, Midwest, and New England regions as unseasonably warm weather covered much of the U.S.



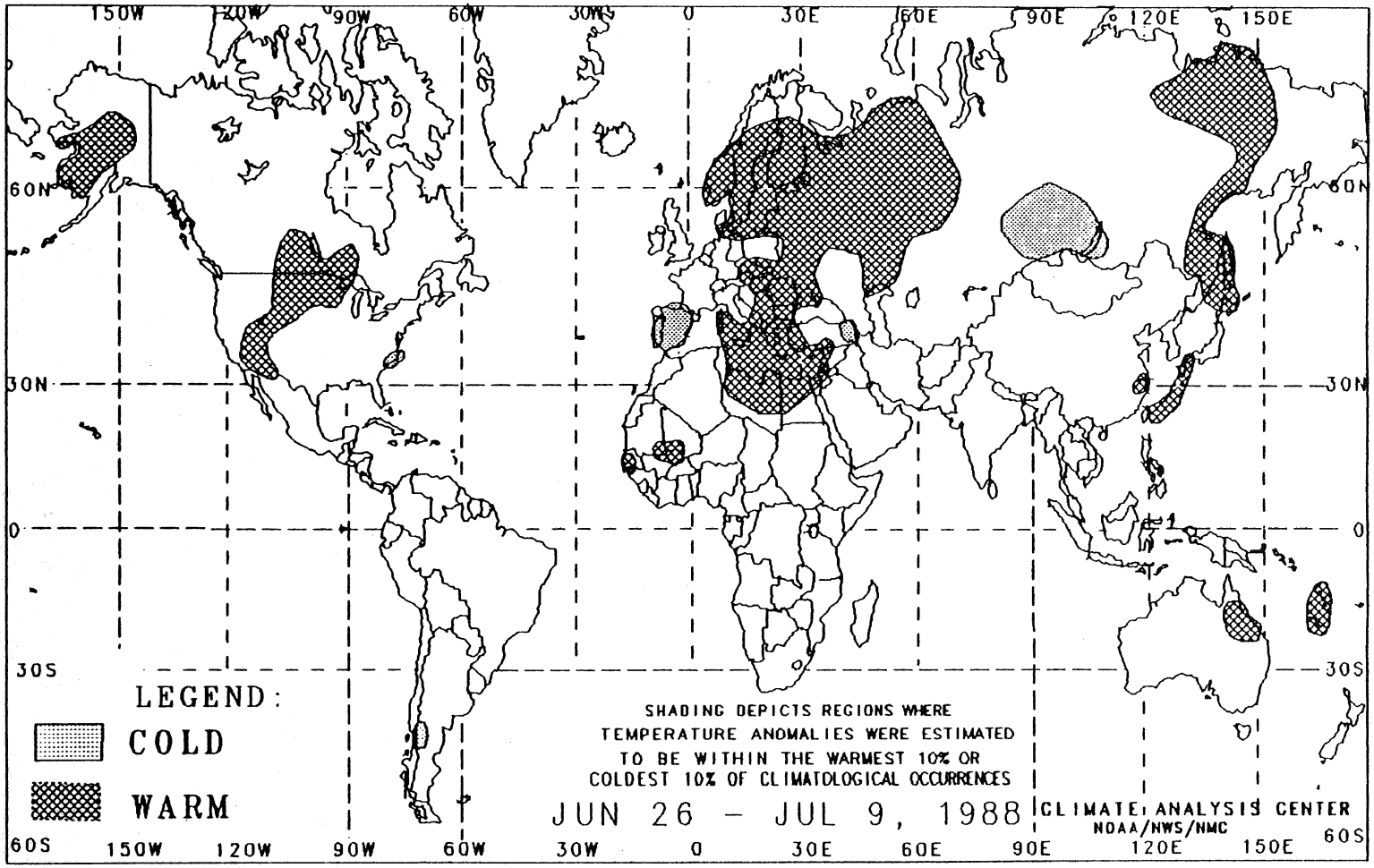
AREA NAMES COMMONLY USED



AREA NAMES COMMONLY USED

GLOBAL TEMPERATURE ANOMALIES

2 Week



The anomalies on this chart are based on approximately 2500 observing stations for which at least 13 days of temperature observations were received from synoptic reports. Many stations do not operate on a twenty-four hour basis so many night time observations are not taken. As a result of these missing observations the estimated minimum temperature may have a warm bias. This in turn may have resulted in an overestimation of the extent of some warm anomalies.

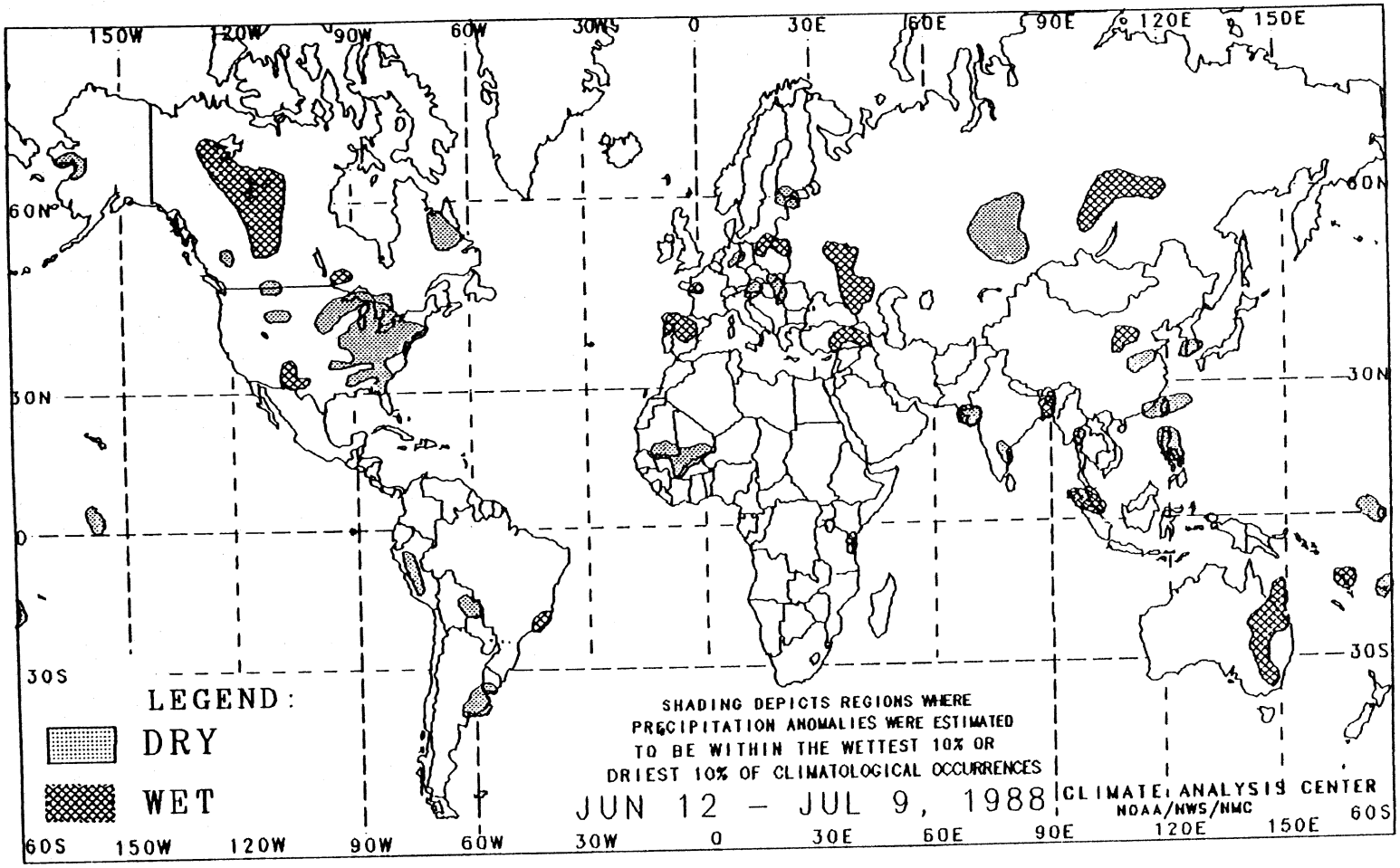
Temperature anomalies are not depicted unless the magnitude of temperature departures from normal exceeds 1.5°C.

In some regions, insufficient data exist to determine the magnitude of anomalies. These regions are located in parts of tropical Africa, southwestern Asia, interior equatorial South America, and along the Arctic Coast. Either current data are too sparse or incomplete for analysis, or historical data are insufficient for determining precentiles, or both. No attempt has been made to estimate the magnitude of anomalies in such regions.

The chart shows general areas of two week temperature anomalies. Caution must be used in relating it to local conditions, especially in mountainous regions.

GLOBAL PRECIPITATION ANOMALIES

4 Week



The anomalies on this chart are based on approximately 2500 observing stations for which at least 27 days of precipitation observations (including zero amounts) were received or estimated from synoptic reports. As a result of both missing observations and the use of estimates from synoptic reports (which are conservative), a dry bias in the total precipitation amount may exist for some stations used in this analysis. This in turn may have resulted in an overestimation of the extent of some dry anomalies.

In climatologically arid regions where normal precipitation for the four week period is less than 20 mm, dry anomalies are not depicted. Additionally, wet anomalies for such arid regions are not depicted unless the total four week precipitation exceeds 50 mm.

In some regions, insufficient data exist to determine the magnitude of anomalies. These regions are located in parts of tropical Africa, southwestern Asia, interior equatorial South America, and along the Arctic Coast. Either current data are too sparse or incomplete for analysis, or historical data are insufficient for determining percentiles, or both. No attempt has been made to estimate the magnitude of anomalies in such regions.

The chart shows general areas of four week precipitation anomalies. Caution must be used in relating it to local conditions, especially in mountainous regions.

SPECIAL CLIMATE SUMMARY

Climate Analysis Center, NMC
National Weather Service, NOAA

UNITED STATES CLIMATE SUMMARY FOR THE MONTH OF JUNE 1988

Record breaking warmth throughout the northern Rockies and northern Great Plains and unequaled dryness across the Midwest and Southeast highlighted the month of June, along with unusually wet conditions along the central Pacific Coast, the southern thirds of the Rockies and Great Plains, and parts of the Gulf Coast, and unseasonably cool weather in the Pacific Northwest, southern Great Plains, and eastern Great Lakes.

For the third consecutive month, abnormally dry conditions persisted in much of the Midwest and Southeast, while farther east, a majority of the mid-Atlantic and New England regions observed less than half their normal rainfall (see front cover, Figure 1, and Table 1). Many stations set new minimum June precipitation records (see Table 5), as well as three month (April-June) minimum precipitation amounts (see last week's Weekly Climate Bulletin dated 7/2/88). Furthermore, the drought has come at a time when most of the northern Great Plains and Midwest normally receives the bulk of its annual precipitation (late spring and summer). Deficits since April 1 have exceeded 10 inches in eastern Iowa and western Illinois and in eastern Texas and northern Louisiana. Days with measurable rainfall (0.01" or more) in June were scarce (see Figure 2) as many locations in the normally rainy Midwest and Southeast had 27-29 days with no (trace or zero) precipitation.

Since most of the United States reported below normal June precipitation, very few areas measured excess rainfall. These areas included the northern half of the Pacific Coast, the southern Rockies, and widely scattered pockets along the Gulf Coast, in New England, and around the Great Lakes. Above normal rainfall occurred from central California northward into Washington, even though most stations recorded under three inches (see Table 2). Between 4-6 inches of rain fell throughout New Mexico, southwestern Missouri, southern Louisiana, southeastern Alabama, and northern New England, while isolated stations in central Texas, southeastern Louisiana, east-central Kansas, and southeastern Florida measured over 10 inches.

In addition to the record-breaking precipitation amounts, unseasonably hot weather, especially in the north-central U.S., shattered several June maximum temperature thresholds. Departures surpassing $+4^{o}F$ were common across the northern Rockies and northern Great Plains (see Figure 3 and Table 3), as were the 90th and above temperature percentiles (see Figure 4). This is further depicted in Figure 5 as a majority of the stations in the north-central U.S. observed daily departures over $+9^{o}F$ for more than a third of the month. Many stations established new record June average temperatures (see Table 6), while over 70 sites tied or exceeded their extreme June maximum or minimum temperatures (see Table 7). Regionally, the west-north central U.S. (ND, SD, MN, IA, NE, KS, MO) and the Rocky Mountain states (ID, MT, WY, NV, UT, CO, AZ, NM) monthly temperatures ranked first (warmest) this year when comparing other Junes over the past 58 years (since 1931). One hundred degrees Fahrenheit was equaled or surpassed frequently by cities in the Great Plains (see Figure 6).

In contrast, slightly below normal temperatures were prevalent along the Eastern Seaboard, the Gulf Coast, the southern Great Plains, and in the southern and northern Pacific Coast regions. Greatest departures below normal (between -3 to $-5^{o}F$) occurred in northern and western New England, the eastern Carolinas, central California, and eastern Washington (see Table 4 and Figure 3).

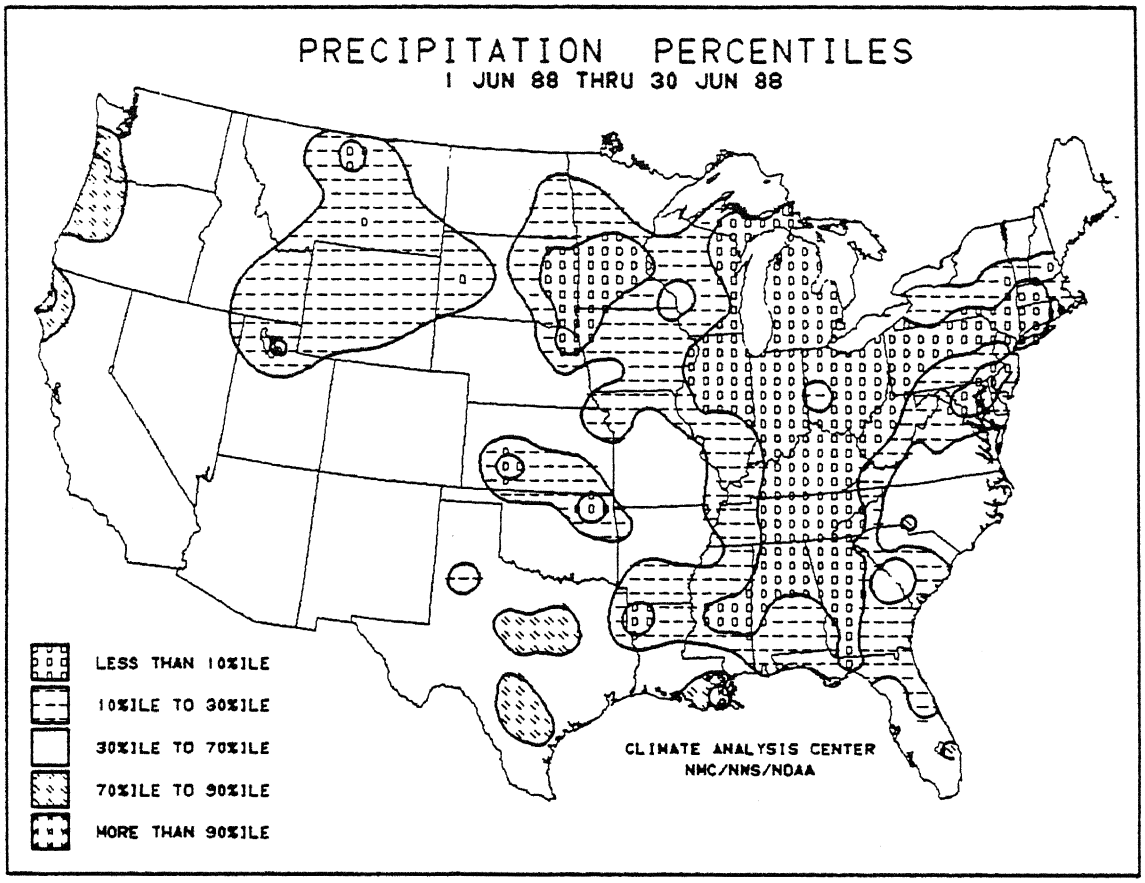


Figure 1. Precipitation percentiles for June 1988. A large portion of the eastern third of the U.S. statistically observed one of its driest Junes based on the normal amount. In addition, many stations historically recorded their driest June (see Table 5).

TABLE 1. JUNE STATIONS WITH LESS THAN 50% OF NORMAL PRECIPITATION AND FOUR OR MORE INCHES OF NORMAL PRECIPITATION.

Station	Total (in.)	%of Nml	Nml Amt (in.)	Station	Total (in.)	%of Nml	Nml Amt (in.)
St. Cloud, MN	0.05	1.0	4.81	Scott AFB, IL	1.47	32.4	4.54
Minneapolis, MN	0.22	5.4	4.05	Eau Claire, WI	1.48	33.9	4.37
Lafayette, IN	0.29	6.8	4.29	Cedar Rapids, IA	1.56	35.1	4.44
Paducah, KY	0.41	9.2	4.45	Salina, KS	1.57	37.5	4.19
Rockford, IL	0.46	10.1	4.56	Kodiak, AK	1.62	39.9	4.06
Washington/Dulles,VA	0.53	12.0	4.41	Elkins, WV	1.63	30.9	5.28
Tulsa, OK	0.58	12.7	4.56	Columbia, SC	1.66	37.4	4.44
Lexington, KY	0.61	14.3	4.26	Victoria, TX	1.73	38.2	4.53
Alexandria, MN	0.73	17.9	4.07	Kansas City,MO (MCI)	1.80	38.5	4.67
Fayetteville, AR	0.75	16.6	4.52	Valparaiso, FL	1.83	33.2	5.52
Burlington, IA	0.83	15.8	5.27	Wichita, KS	1.86	46.5	4.00
Palacios, TX	0.88	19.0	4.64	Houston, TX	2.00	45.2	4.43
Bradford, PA	0.91	21.4	4.26	Biloxi/Keesler, MS	2.03	38.7	5.25
Zanesville, OH	0.91	21.9	4.15	Florence, SC	2.06	44.3	4.65
Columbus, GA	0.94	22.6	4.16	Bowling Green, KY	2.11	46.6	4.53
Harrison, AR	1.02	21.8	4.68	Tallahassee, FL	2.14	32.8	6.53
Chicago/O'Hare, IL	1.05	24.5	4.29	Gainesville, FL	2.25	33.5	6.72
Moline, IL	1.16	27.0	4.30	Pensacola, FL	2.30	40.0	5.75
Cincinnati, OH	1.19	29.2	4.07	Charleston, SC	2.32	35.6	6.52
Kansas City,MO (MKC)	1.29	31.2	4.13	Mobile, AL	2.34	46.3	5.05
Crossville, TN	1.33	30.4	4.38	Daytona Beach, FL	2.38	37.1	6.41
Norfolk, NE	1.33	30.7	4.33	Savannah, GA	2.63	46.2	5.69
Brunswick, GA	1.36	23.7	5.74				

TABLE 2. JUNE STATIONS WITH MORE THAN 150% OF NORMAL PRECIPITATION AND TWO OR MORE INCHES OF PRECIPITATION; OR, STATIONS WITH MORE THAN SIX INCHES OF PRECIPITATION.

Station	Total (in.)	Pct of Normal	Station	Total (In.)	Pct of Normal
Homestead AFB, FL	16.99	***	Valdez, AK	5.05	192.0
West Palm Beach, FL	10.94	138.3	Carlsbad, NM	4.19	590.6
New Orleans/Moisant, LA	10.74	233.0	Cannon AFB, NM	4.03	155.0
Miami, FL	10.36	113.5	Baker, OR	3.07	222.5
Ozark/Cairns AFB, AL	8.28	***	Eugene, OR	2.37	194.2
Fort Myers, FL	7.18	82.3	Portland, OR	2.32	160.3
Mt. Washington, NH	6.81	96.7	McGrath, AK	2.29	160.3
New Orleans/Lk Front, LA	6.53	***	Fairbanks, AK	2.24	169.6
Tucumcari, NM	5.72	408.6	Eureka, CA	2.20	405.8
Waco, TX	5.57	216.7	Laramie, WY	2.18	184.7
San Antonio, TX	5.50	182.7	North Bend, OR	2.00	157.0

(Note: Stations without normals are indicated by asterisks).

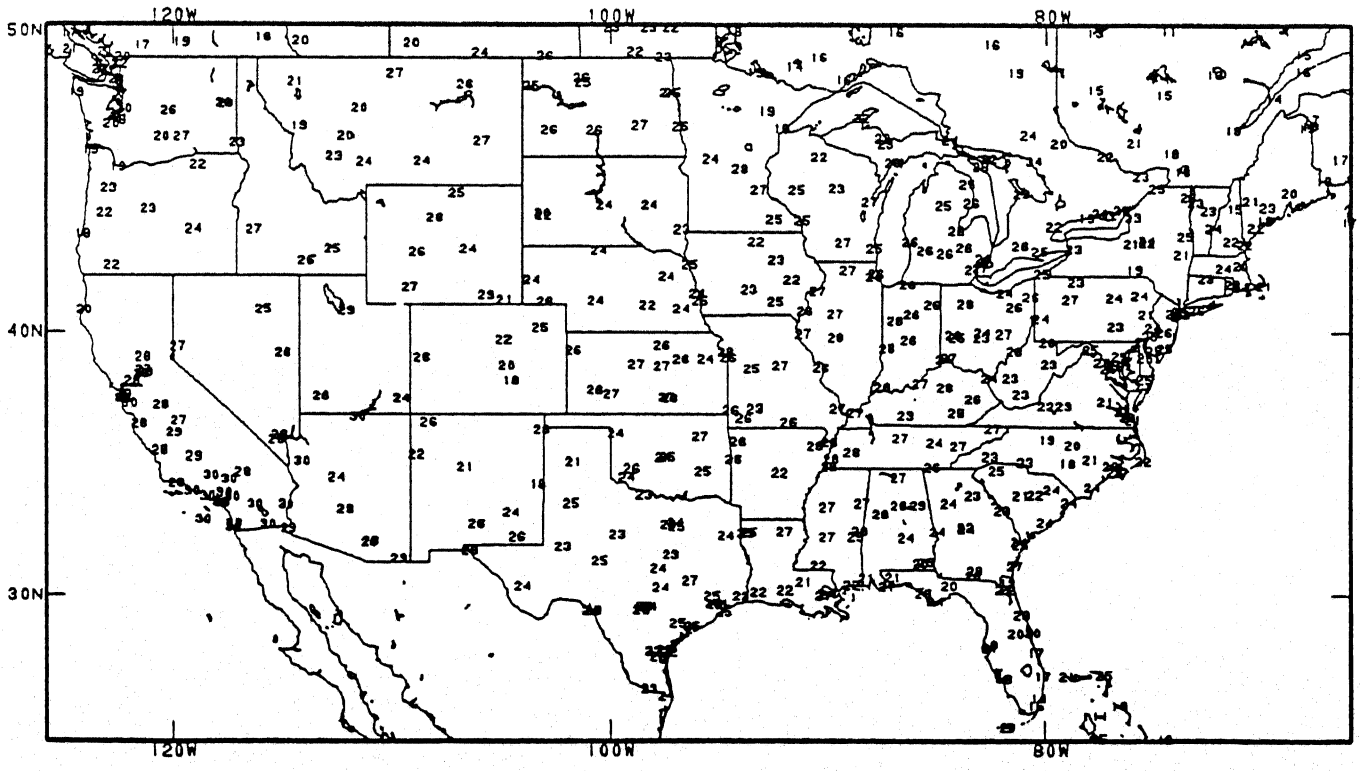


Figure 2. Number of days (maximum=30) during June 1988 that had no (trace or zero) precipitation. Many locations in the normally rainy Midwest and Southeast only had 2-3 days in June with measurable rainfall.

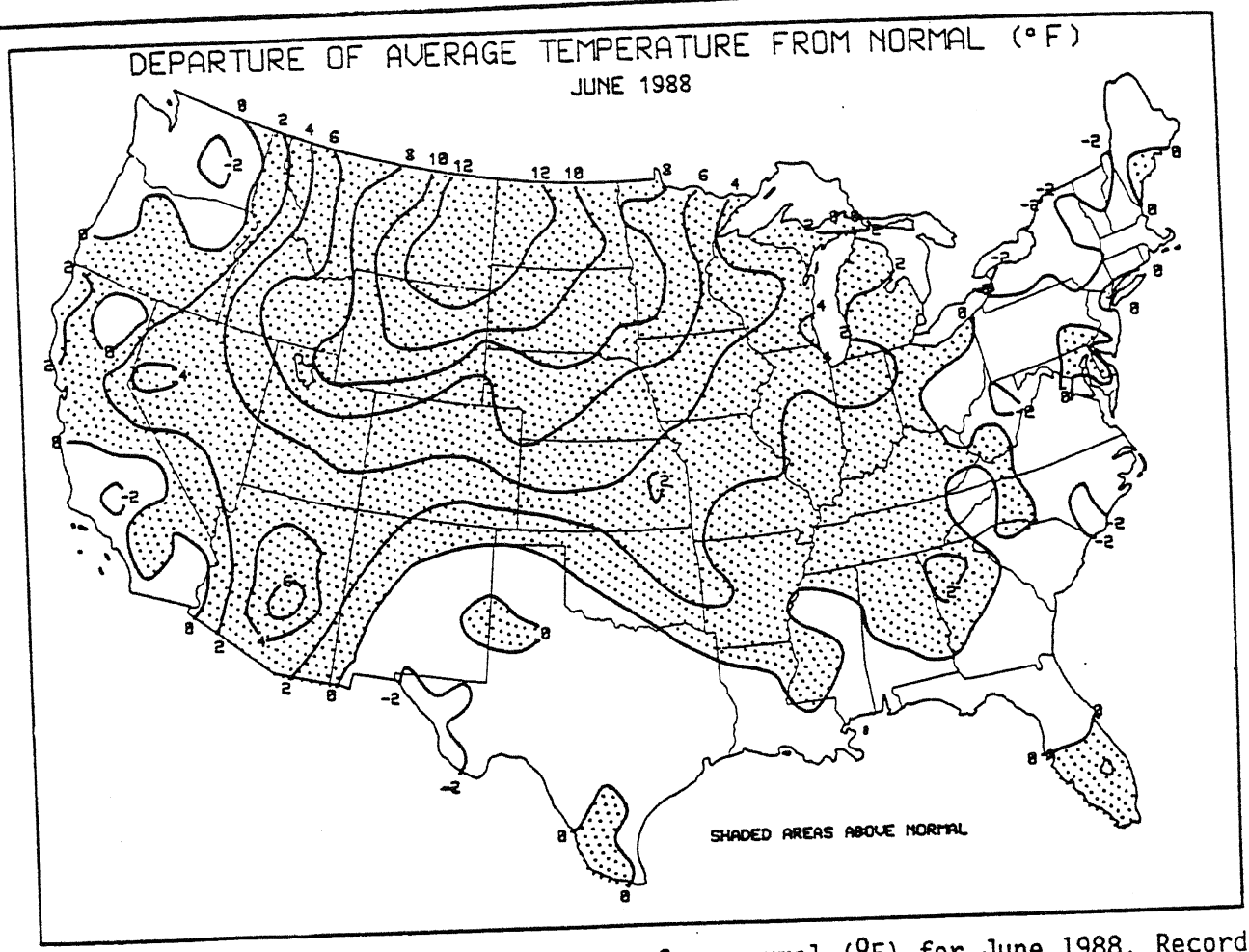


Figure 3. Average temperature departure from normal (^{o}F) for June 1988. Record-breaking warmth covered the northern Rockies and northern Great Plains as many stations established new monthly extreme (see Table 7) and average (see Table 6) temperatures.

TABLE 3. JUNE AVERAGE TEMPERATURES 7^{o}F OR MORE ABOVE NORMAL.

Station	Degrees F Mean	Dep
Miles City, MT	79	+13
Williston, ND	77	+13
Glasgow, MT	77	+13
Billings, MT	76	+12
Bismarck, ND	76	+12
Dickinson, ND	75	+12
Minot, ND	75	+12
Sheridan, WY	74	+12
Rapid City, SD	76	+11
Worland, WY	76	+11
Jamestown, ND	75	+11
Lander, WY	73	+11
Casper, WY	73	+10
Pierre, SD	77	+ 9
Aberdeen, SD	75	+ 9
Fargo, ND	74	+ 9

Station	Degrees F Mean	Dep
Bozeman, MT	66	+9
Valentine, NE	76	+8
Salt Lake City, UT	76	+8
Sioux Falls, SD	76	+8
Alexandria, MN	73	+8
Havre, MT	71	+8
Pocatello, ID	70	+8
Great Falls, MT	70	+8
Helena, MT	68	+8
Cut Bank, MT	65	+8
North Platte, NE	75	+7
Huron, SD	75	+7
Sidney, NE	72	+7
Grand Forks, ND	71	+7
Burley, ID	70	+7
Rock Springs/Sweetwater, WY	67	+7

TABLE 4. JUNE AVERAGE TEMPERATURES 3°F OR MORE BELOW NORMAL.

Station	Degrees F Mean	Dep	Station	Degrees F Mean	Dep
Mt. Washington, NH	40	-5	Wenatchee, WA	64	-3
Massena, NY	62	-3	Wilmington, NC	74	-3
Griffiss AFB, NY	62	-3	Bakersfield, CA	75	-3
Utica, NY	62	-3	Sumter/Shaw AFB, SC	75	-3
Elkins, WV	63	-3	Carlsbad, NM	78	-3
Rochester, NY	67	-3			

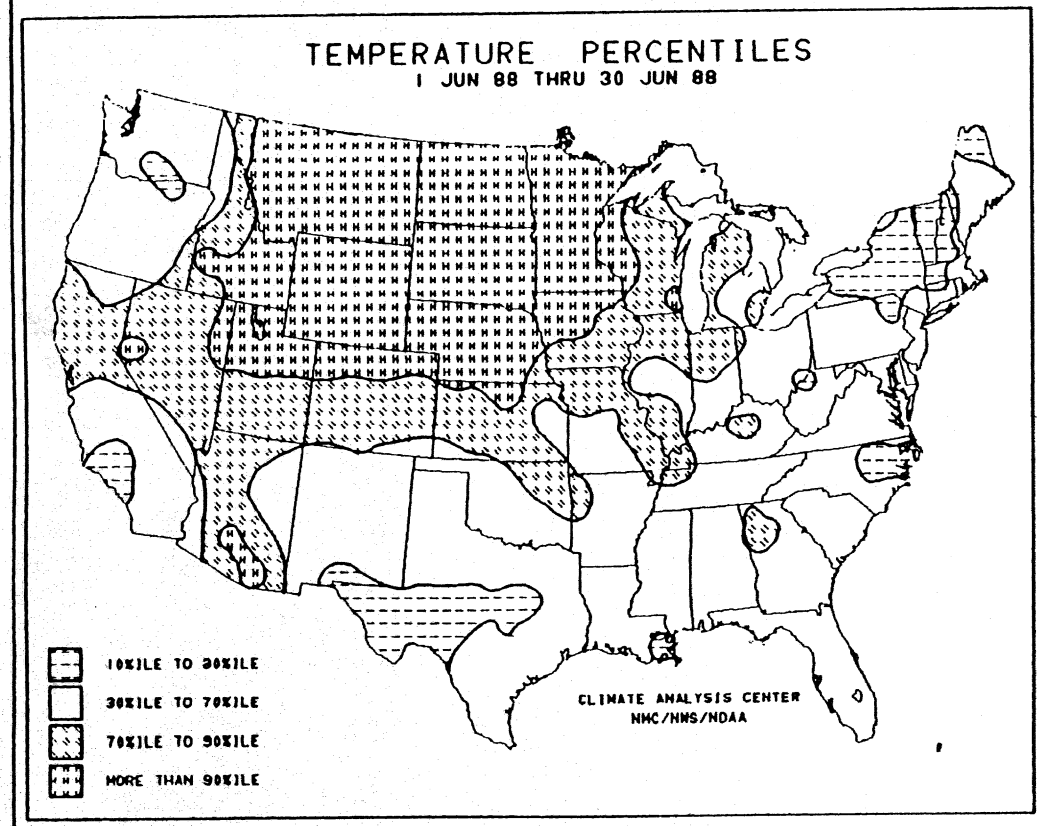


Figure 4. Temperature percentiles for June 1988. Much of the region covered in the more than 90th percentile (areas with "H") also historically observed one of their warmest Junes.

TABLE 5. RECORD JUNE TOTAL PRECIPITATION.

Station	Total (In.)	Normal (In.)	Pct of Normal	Record Type	Records Began
Chicago/O'Hare, IL	1.05	4.29	24.5	LOWEST	1959
Sioux Falls, SD	0.91	3.68	24.7	LOWEST	1951
Houghton Lake, MI	0.85	3.10	27.4	LOWEST	1964
Fort Wayne, IN	0.77	3.62	21.3	LOWEST	1951
Marquette, MI	0.71	3.89	18.3	LOWEST	1872
Miles City, MT	0.70	2.75	25.5	LOWEST	1938
Milwaukee, WI	0.70	3.57	19.6	LOWEST	1947
Hartford, CT	0.68	3.36	20.2	LOWEST	1947
Youngstown, OH	0.66	3.51	18.8	LOWEST	1944
Cleveland, OH	0.65	3.47	18.7	LOWEST	1947
Chattanooga, TN	0.63	3.33	18.9	LOWEST	1951
Flint, MI	0.63	3.21	19.6	LOWEST	1951
Lexington, KY	0.61	4.26	14.3	LOWEST	1951
Sioux City, IA	0.53	3.99	13.3	LOWEST	1951
Washington/Dulles, VA	0.53	4.41	12.0	LOWEST	1963
Sault Ste. Marie, MI	0.52	3.24	16.1	LOWEST	1947
Knoxville, TN	0.51	3.93	13.0	LOWEST	1947
South Bend, IN	0.48	3.92	12.2	LOWEST	1944
Rockford, IL	0.46	4.56	10.1	LOWEST	1951
Akron/Canton, OH	0.37	3.25	11.4	LOWEST	1944
Indianapolis, IN	0.36	3.97	9.1	LOWEST	1947
Birmingham, AL	0.31	3.59	8.6	LOWEST	1947
Grand Rapids, MI	0.25	3.66	6.8	LOWEST	1947
Lansing, MI	0.20	3.92	5.1	LOWEST	1959
Atlanta, GA	0.17	3.39	5.0	LOWEST	1947
Shreveport, LA	0.13	3.46	3.8	LOWEST	1947
Jackson, MS	0.10	3.11	3.2	LOWEST	1947
Lihue, Kauai, HI	0.07	1.61	4.4	LOWEST	1905
St. Cloud, MN	0.05	4.81	1.0	LOWEST	1893
Unalakleet, AK	0.00	1.20	0.0	LOWEST	1951

Note: Zero totals may or may not contain "trace" amounts.

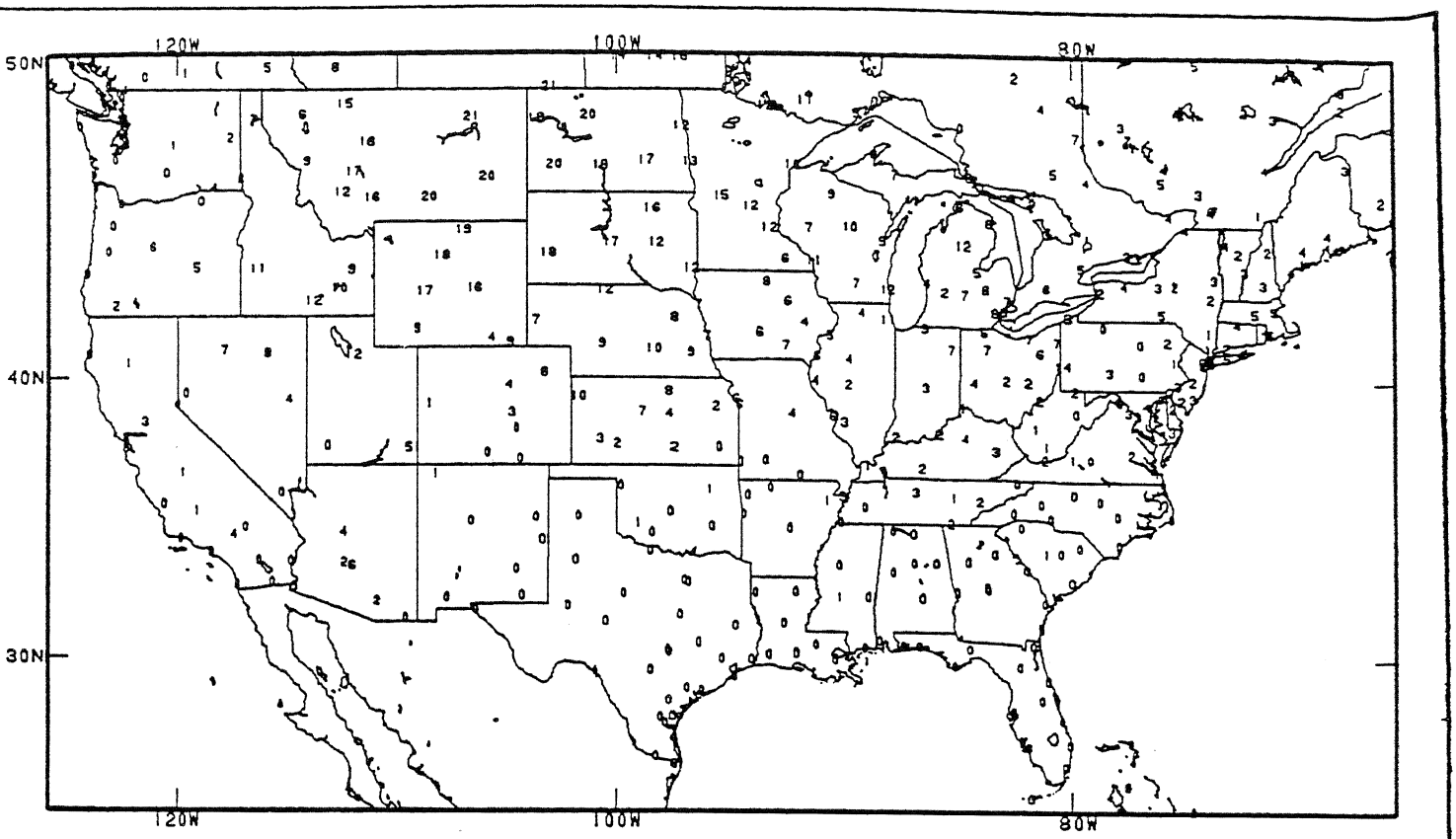


Figure 5. Number of days (maximum=30) in June 1988 where the daily temperature departure from normal was +10°F or more. Over half the month (15 days) in much of Montana, Wyoming, and the Dakotas had daily temperature departures exceeding +9°F.

TABLE 6. RECORD JUNE AVERAGE TEMPERATURES.

Station	AvgT(°F)	Nml AvgT	Dep Nml AvgT	Type	Records Began
Williston, ND	77.4	64.0	+13.4	HIGHEST	1947
Glasgow, MT	77.0	64.0	+13.0	HIGHEST	1956
Sioux Falls, SD	76.5	68.4	+ 8.1	HIGHEST	1951
Norfolk, NE	76.3	70.7	+ 5.6	HIGHEST	1951
Billings, MT	76.3	63.9	+12.4	HIGHEST	1947
Rapid City, SD	75.9	65.3	+10.6	HIGHEST	1888
Bismarck, ND	75.7	64.2	+11.5	HIGHEST	1875
Aberdeen, SD	75.0	66.2	+ 8.8	HIGHEST	1951
Sheridan, WY	74.3	61.7	+12.6	HIGHEST	1908
Fargo, ND	73.9	65.3	+ 8.6	HIGHEST	1947
La Crosse, WI	73.6	68.5	+ 5.1	HIGHEST	1952
Casper, WY	72.7	62.8	+ 9.9	HIGHEST	1947
Lander, WY	72.7	62.2	+10.5	HIGHEST	1947
Havre, MT	70.9	63.1	+ 7.8	HIGHEST	1880
Great Falls, MT	69.8	61.7	+ 8.1	HIGHEST	1947
Pocatello, ID	69.8	62.4	+ 7.4	HIGHEST	1947
Helena, MT	68.5	60.1	+ 8.4	HIGHEST	1880
Cheyenne, WY	67.5	61.9	+ 5.6	HIGHEST	1873
International Falls, MN	67.6	61.2	+ 6.4	HIGHEST	1947

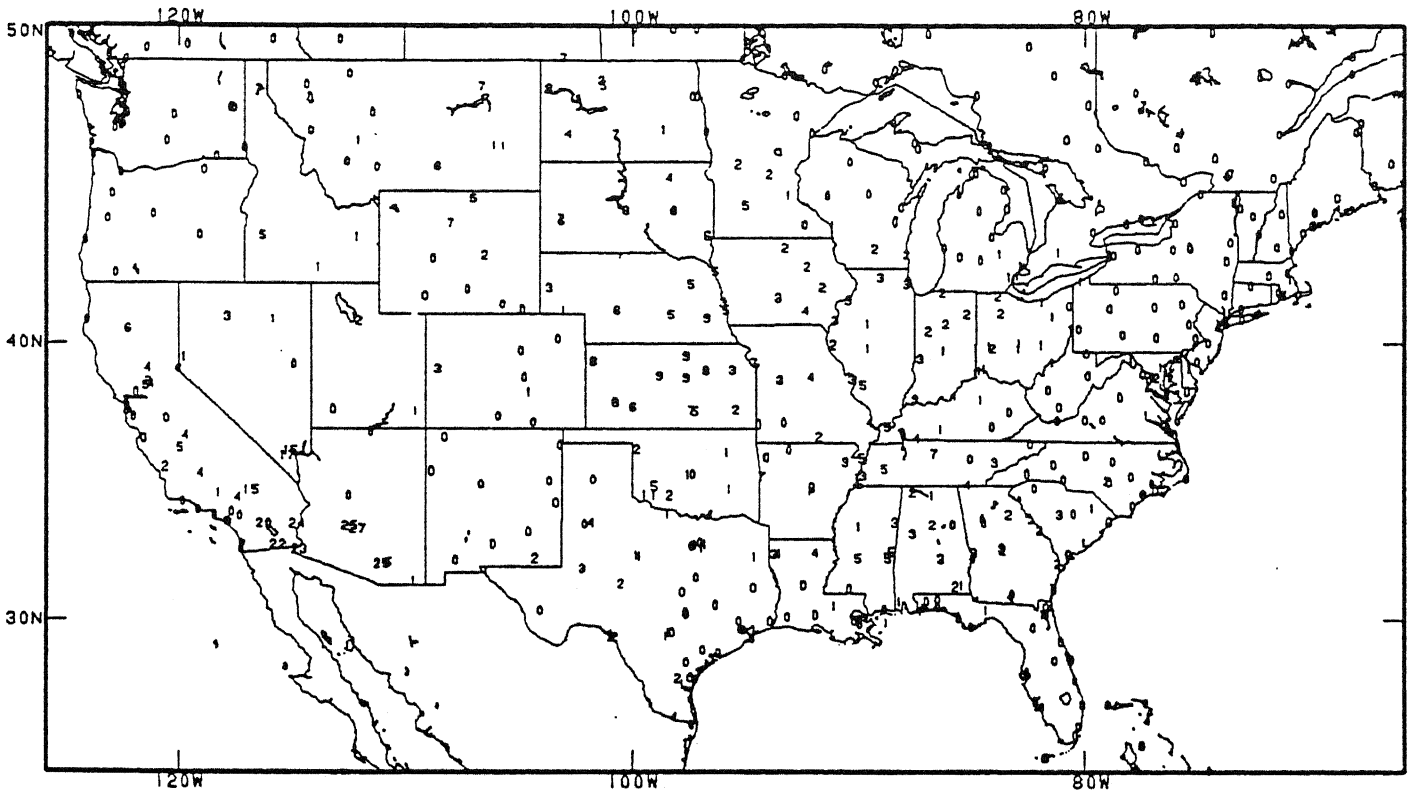


Figure 6. Number of days (maximum=30) that the temperature equaled or exceeded 100°F during June 1988. Unseasonably hot weather scorched the Great Plains as highs reached into the one hundreds several times during the month (11 times at Miles City, MT.)

TABLE 7. RECORD JUNE EXTREME TEMPERATURES.

Station	Extreme (Degree F)	Record Type	Records Began	Station	Extreme (Degree F)	Record Type	Records Began
Yuma, AZ	118	HIGHEST	1949	Knoxville, TN	102	HIGHEST	1942
Tucson, AZ	114	HIGHEST	1940	Casper, WY	102	HIGHEST	1950
Del Rio, TX	111	HIGHEST	1963	Washington, DC	101	HIGHEST	1941
Valentine, NE	110	HIGHEST	1956	Rockford, IL	101	HIGHEST	1950
Sioux Falls, SD	110	HIGHEST	1946	Lexington, KY	101	HIGHEST	1945
Huron, SD	109	HIGHEST	1939	Shreveport, LA	101	HIGHEST	1953
Sioux City, IA	108	HIGHEST	1940	Flint, MI	101	HIGHEST	1942
Glasgow, MT	108	HIGHEST	1955	El Paso, TX	101	HIGHEST	1939
Grand Island, NE	107	HIGHEST	1939	Madison, WI	101	HIGHEST	1940
Lincoln, NE	107	HIGHEST	1971	Milwaukee, WI	101	HIGHEST	1941
Bismarck, ND	107	HIGHEST	1940	Baltimore, MD	100	HIGHEST	1951
Fort Wayne, IN	106	HIGHEST	1939	Huntington, WV	100	HIGHEST	1962
Miles City, MT	106	HIGHEST	1938	Parkersburg, WV	100	HIGHEST	1888
Norfolk, NE	106	HIGHEST	1946	Helena, MT	100	HIGHEST	1941
Winnemucca, NV	106	HIGHEST	1950	Akron, OH	100	HIGHEST	1949
Williston, ND	106	HIGHEST	1962	Erie, PA	100	HIGHEST	1953
Rapid City, SD	106	HIGHEST	1943	Philadelphia, PA	100	HIGHEST	1941
Peoria, IL	105	HIGHEST	1940	Lansing, MI	99	HIGHEST	1949
Jackson, MS	105	HIGHEST	1963	Great Falls, MT	99	HIGHEST	1938
Sheridan, WY	105	HIGHEST	1940	New York/La Guardia, NY	99	HIGHEST	1941
Chicago/O'Hare, IL	104	HIGHEST	1958	Youngstown, OH	99	HIGHEST	1943
Moline, IL	104	HIGHEST	1927	Alpena, MI	98	HIGHEST	1960
South Bend, IN	104	HIGHEST	1939	Grand Rapids, MI	98	HIGHEST	1964
Detroit, MI	104	HIGHEST	1959	Charleston, WV	98	HIGHEST	1948
Meridian, MS	104	HIGHEST	1946	Green Bay, WI	98	HIGHEST	1949
Cleveland, OH	104	HIGHEST	1941	Pittsburgh, PA	98	HIGHEST	1953
Toledo, OH	104	HIGHEST	1956	Portland, ME	97	HIGHEST	1940
Pocatello, ID	103	HIGHEST	1950	Providence, RI	97	HIGHEST	1954
Des Moines, IA	103	HIGHEST	1939	Burlington, VT	97	HIGHEST	1944
Waterloo, IA	103	HIGHEST	1949	Marquette, MI	96	HIGHEST	1979
Columbia, MO	103	HIGHEST	1969	Buffalo, NY	96	HIGHEST	1943
Reno, NV	103	HIGHEST	1943	Houghton Lake, MI	93	HIGHEST	1964
Indianapolis, IN	102	HIGHEST	1931	Roswell, NM	51	LOWEST	1973
St. Louis, MO	102	HIGHEST	1958	El Paso, TX	46	LOWEST	1939
La Crosse, WI	102	HIGHEST	1951	Bakersfield, CA	45	LOWEST	1938
Cincinnati, OH	102	HIGHEST	1948	Topeka, KS	43	LOWEST	1946
Dayton, OH	102	HIGHEST	1944	Yuma, AZ	38	LOWEST	1949

SPECIAL CLIMATE SUMMARY

BRIEF UPDATE ON THE ABNORMALLY DRY CONDITIONS ACROSS THE CENTRAL U.S.

In comparing the U.S. percentage of normal precipitation (since April 1) in the Weekly Climate Bulletin dated June 18, 1988 versus the updated chart (below), some relief from rains has reduced the shaded regions (less than 50%) in the northern Great Plains, Texas, and upper Midwest. Recently, however, below normal precipitation in the eastern third of the country has increased deficiencies and lowered percentages. As a result, areas in the Ohio and Tennessee Valleys are now under 50%. In order to ease the current situation, substantial and timely rainfall is urgently needed throughout most of the eastern half of the nation.